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83

Progress Report of the Forest Survey Branch 1888-89

Sub.- Forest Admn. Report Survey Br.

Place:- Calcutta

Year:- 1888-89

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X

PROGRESS REPORT

OF

THE FOREST SURVEY BRANCH

FOR

1888-89.

BY ORDER OF THE LIEUTENANT GOVERNOR OF BENGAL * FORWARDED

No. 390 F., dated Simla, the 15th May 1890.

From—J. W. P. MUIR-MACKENZIE, Esq., C.S., *Under-Secy. to the Govt. of India,*
To—*The Surveyor General of India.*

I AM directed to acknowledge the receipt of your letter No. 3344 S., dated the 19th December last, submitting, with a Review of the work done, the Annual Progress Report of the Forest Survey Branch for the year 1888-89.

2. The Government of India agrees with you in considering that the work done during the year, of which a complete summary is given in your letter under reply, was satisfactory, and concurs in your commendation of Mr. Reynolds, the Superintendent, and the Officers of the Forest Survey Branch serving under him.

No. 391 F.

COPY forwarded to the Inspector General of Forests for information.

PROGRESS REPORT OF THE FOREST SURVEY BRANCH FOR 1888-89.

No. 3344 S., dated Calcutta, the 19th December 1889.

From—COLONEL H. R. THUILLIER, R.E., *Surveyor General of India,*

To—*The Secretary to the Government of India,* REVENUE AND AGRICULTURAL DEPT.

I HAVE the honour to forward the Annual Progress Report of the Forest Survey Branch for the year 1888-89, submitted by Mr. W. H. Reynolds, Superintendent, Forest Survey Branch.

2. The principal operations conducted during the year were in the Bashahr State, Punjab, and in the Jubbulpore and Raipur districts, Central Provinces, in continuation of the work in the preceding season; the survey of the Tehri-Garhwal forests, North-Western Provinces, and in Bérar, were also continued. New surveys were instituted in the Karamba forest, Jaunsar Division, the Morar forest, Naini Tal Division, and in the Ahiri forest, Chanda district, Central Provinces.

3. The outturn of field and office work is shown in Appendices A and B. The total area topographically surveyed amounts to 652 square miles, of which 32 square miles were mapped on the 16-inch scale, 617 on the 4-inch scale, and 3 on the 2-inch scale. The outturn under this head is lower than last year, which is due chiefly to the larger area done on the 4-inch scale, a much larger proportion of the work done last year being on the 2-inch scale, and the country operated in during that year being more open than is usually met with in forest tracts. The traverse basis furnished by the Revenue Branch of this Department in the districts of Raipur and Jubbulpore was fully utilized and found most valuable. The classes of areas surveyed are shown in Appendix E. With the exception of 171 square miles of undemarcated forests and other lands in Bashahr, the survey has been confined to demarcated forests. Of forest boundaries 499 linear miles were surveyed, against 146 in the preceding year, and 140 miles were traversed. Triangulation was extended over an area of 1,904 square miles, against 990 square miles in the previous season.

4. The detail survey was checked in mountainous or broken country by running level contour lines through the work at prescribed vertical distances, as described in last year's Report. In addition to this check, 96 linear miles were "partalled," and Mr. Reynolds reports that little or no revision of the original work was found to be necessary.

5. The cost-rate of the survey in the Bashahr State is R58 per square mile, which is slightly lower than last year's rate. In the Central Provinces the cost-rates are, in Jubbulpore district, R51-9 as against R50 in the previous year, and in Raipur district R51-6; both rates include the cost of survey of the boundaries on the 16-inch scale. No cost-rate is given for the survey in the Chanda district as the work is incomplete. In the North-Western Provinces (Morar and Dolmar forests) the cost-rate is R21 for the detail survey and R14 for the triangulation and computations; the Tehri-Garhwal and Jaunsar surveys being still incomplete no cost-rates are given.

6. A creditable amount of map-drawing has been performed during the year, the details of which are fully given in Appendix B. The Forest Map of India showing Reserved and Protected Forests corrected up to 1st April 1888, on the 48-mile scale, has been completed and sent to the Head-Quarters Office of this department, Calcutta, to be printed. Revision of the catalogue of the published maps of all classes of forests and waste lands has been proceeded with, and the portion relating to the Pegu and Tenasserim Circles of Lower Burma has been completed and published. The photo-zincographing of the maps prepared by the Forest Survey Branch continues to be done at the Trigonometrical Survey Office, Dehra Dun.

7. In the Forest School at Dehra Dun instruction was given in drawing to 38 students by assistants of the Forest Survey Branch, and the first year's students were instructed in field work by Dr. Warth. An examination was held by the Superintendent in November 1888, at which 25 passed the prescribed standard and received certificates of qualification in surveying.

8. The year's record is, I consider, very satisfactory and reflects credit upon Mr. Reynolds and the officers serving under him.

9. The total expenditure for the year amounted to R78,988, as against R75,698 in 1887-88.

CONTENTS.

The Season's Field Work.

	PARA.
Surveys completed or in progress	3
New surveys commenced during the year	4
Duration of the field season	5
Triangulation and traversing	6
Area topographically surveyed	7
Check surveys	8
Comparison with previous year	9
Appendix A	10
Cost-rates	11

Punjab.

Bashahr survey	12
Triangulation	13
Area topographically surveyed	14
Index map showing progress	15
Season's cost-rate	16
Future programme	17

Central Provinces.

Central Provinces surveys	18

Jubbulpore District.

Jubbulpore survey	19
Area surveyed	20
Tests applied to work	21
Superintendent's inspection	22
Cost	23

Raipur District.

Raipur surveys	24
Area triangulated and topographically surveyed	25
Tests applied	26
Superintendent's inspection	27
Cost	28
Revenue survey traversing	29

Chanda District.

Survey of Ahiri forests	30
Duration of field work	31
Areas surveyed	32
Cost	33
Total expenditure in Central Provinces	34
Summary of season's field work	35

North-Western Provinces.

Central Circle.

Morar and Dolmar forests	36
Area surveyed	37
Cost-rate	38
Superintendent's inspection	39

School Circle.

Surveys in progress	40
Area surveyed	41
Cost-rate	42
Total expenditure on surveys in North-Western Provinces	43

PARA.

BERAR.

Melghat, area surveyed 44
Western boundary of the Melghat pending settlement 45
Expenditure 46

BENGAL.

Singbhoom 47
Expenditure 48

OFFICE WORK.

Computations 49
Areas 50

MAP-DRAWING.

Appendix B 51
North-Western Provinces and Oudh 52
Punjab 53
Assam 54
Bengal 55
Berar 56
Central Provinces 57
Burma 58
Forest Map of India 59
Tracings and other miscellaneous work 60
List of best available printed maps for forest purposes 61

FOREST SCHOOL STUDENTS.

Drawing classes 62
Field instruction in surveying 63
Examinations 64

EXPENDITURE DURING THE YEAR.

Appendices C and D 65

OFFICERS OF THE SUPERIOR STAFF.

Mr. W. H. Reynolds, Superintendent of Forest Surveys 66
Mr. E. Litchfield, Deputy Conservator of Forests, 4th grade 67

FOREST SURVEYORS.

Upper Subordinate Establishments 68
Mr. T. S. Marten 69
Mr. J. Marten 70
Mr. A. Descubes 71
Mr. C. Litchfield 72
Mr. J. H. Nichol 73

SUB-SURVEYORS.

Strength of Native Establishment 74
Services of Native Assistants 75
Health of Establishment 76
Work done by the Survey of India for the Forest Survey Branch 77
Documents accompanying the Report 78

ANNUAL PROGRESS REPORT

OF THE

FOREST SURVEY BRANCH OF THE FOREST DEPARTMENT.

FROM 1ST OCTOBER 1888 TO 30TH SEPTEMBER 1889.

BY

W. H. REYNOLDS, ESQ., F.R.G.S.,

SUPERINTENDENT OF FOREST SURVEYS.

The operations of the Forest Survey Branch of the Forest Department that are now reported on are for the period 1st October 1888 to 30th September 1889.

2. The direction and superintendence of the surveys have, throughout the year, been in the hands of Mr. W. H. Reynolds.

THE SEASON'S FIELD WORK.

Surveys completed or in progress.

3. The principal field operations were in the Punjab (Bashahr) and in three districts of the Central Provinces. Surveys were also conducted in the Jaunsar Division of the School Circle and the Naini Tal Division of the Central Circle of the North-Western Provinces in continuation of the previous season's operations, and a small area was completed in Berar. The surveys in the Naini Tal Division have been completed since the close of the year under report.

New surveys commenced during the year.

4. The following new surveys were taken in hand during the year:—

(*a*). The Karamba forest in Jaunsar Division,

(*b*) The Morar forest in the Naini Tal Division,

(*c*) The Ahiri forests in the Chanda district,

and orders have been received, in correspondence ending with Inspector General of Forests' endorsement No. 952, dated 28th December 1888, to take up the survey of the Reserved Forests in the Bhandara district of the Central Provinces. The survey of the small forest block of Korwa has also been ordered in connection with the survey of the leased forests of Tehri-Garhwal in the Jaunsar Forest Division.

Duration of the field season.

5. For the parties working in the Himalayas and the several districts of the Central Provinces the average duration of the field season was about seven months. The field-work in Tehri-Garhwal could only be carried on for two short periods, just before and immediately after the rains; in the Central Provinces field-work was carried on in the several districts for various periods between the end of November and beginning of July, according to the healthi-

ness of the districts in which work was in progress, and in Bashahr a few of the plane-tablers were in the field throughout the year.

Triangulation and traversing.

6. Triangulation was extended over an area of 1,904 square miles as against 990 square miles in the previous field season, and an area of 127 square miles was traversed with theodolite and chain.

Area topographically surveyed.

7. The total area topographically surveyed and for which the usual forest information has been compiled is 652 square miles, *viz.*,—

On the	16-inch	scale,	32	square	miles.
„	4-inch	„	617	„	„
„	2-inch	„	3	„	„

Check surveys.

8. In addition to the checks effected by running instrumental contour lines throughout the topographical work at fixed vertical distances, 96 linear miles of check surveys were carried out, and little or no revision to speak of was necessary to the original work.

Comparison with previous year.

9. As compared with the previous year, the area triangulated is much greater than the outturn for 1887-88, but the area surveyed in full detail is less than that of the previous year. The latter is chiefly due to the fact that, with the exception of a small area of 3 square miles, the entire area topographically surveyed during the year under report is on the large scales of 4 and 16 inches=1 mile, whereas out of the total area of 979 square miles reported during the previous year (1887-88) 553 square miles were surveyed on the *small scale* of 2"=1 mile; moreover, the favourable results of last year's large outturn was reported in paragraph 6 of the Annual Report to be "due in part to portions of the country under survey having been more open than is usually the case in Forest Survey work."

Appendix A.

10. A summary of the outturn of field-work and computations will be found in Appendix A, and a statement showing the classes of areas surveyed will be found in Appendix E.

Cost-rates.

11. The cost-rate for each of the separate surveys is given under the Provincial heading of the several Provinces in which surveys were in progress, and more detailed information is also given regarding each of the surveys under the same headings.

PUNJAB.

Bashahr survey.

12. The survey of the Bashahr State in the Punjab was resumed in continuation of the previous season's work. Triangulation was carried on in the Pabar Range, the Baspa Valley and in the Hangrang Pergunnah, while detailed topographical work on the 4-inch scale was pushed on in Pergunnah Bagi-Mastgarh, in the western part of the State, and in Pergunnah Suwa and Tukpa in the Upper Sutlej Valley.

Triangulation.

13. Two triangulating parties were at work from early in May to the middle of October, and this branch of the survey was extended over an area of 889 square miles. Many of the stations at which the theodolite was set up were

over 14,000 feet above sea-level, and some few were over 18,000. Considerable hardships were experienced by those employed upon the work owing to intense cold and difficulties in obtaining supplies and fuel in these elevated regions.

Area topographically surveyed.

14. The Surveyors employed on topographical work were in the field from April to the close of the survey year; some few of them were employed upon field-work throughout the year. Two hundred and fifteen square miles were surveyed in detail on the 4-inch scale with instrumental contour lines laid down at every 500 feet vertical. The average number of plane-table stations per square mile is 105. The triangulation is well in advance of the topographical survey.

The areas in Bashahr up to the limit of tree growth are being surveyed on the 4-inch scale, and above this limit the detail survey is to be on the 1-inch scale.

Mr. Reynolds, Superintendent of Forest Surveys, was present with the Bashahr party, personally supervising the survey, from the middle of April to the setting in of the rains, and again for a month before the close of the survey year.

Index map showing progress.

15. An index map illustrating the progress of the Bashahr survey is attached hereto and noted as "Enclosure No. 1."

Season's cost-rate.

16. The cost of the season's work, estimated on the area surveyed in detail, on the 4-inch scale, is R57-8 as compared with R60 in the previous year. This figure includes the cost of a considerable amount of triangulation in advance of the detailed topographical work.

The total expenditure incurred on account of the Bashahr survey, during the year under report, is R12,631; the details are given in Appendix C.

Future programme.

17. Up to date only 4-inch areas in Bashahr have been dealt with, but during the coming field season the intermediate strips of country situated between blocks of 4-inch work and which are to be surveyed on the 1-inch scale will be taken up; and as the smaller scale survey can be done far more rapidly than the detailed 4-inch work, and as the Surveyors have now come to know the country and become acquainted with the people, a good outturn of work should be reported for 1889-90, and the following year the 1-inch areas of the Bashahr State should be well advanced towards completion, provided the continuity of the work is left undisturbed and no immediate urgent calls are made elsewhere for the services of the Forest Survey Branch. The 4 and 1-inch areas left for survey are approximately shown on the Bashahr index map (Enclosure No. 1).

Central Provinces.

Central Provinces surveys.

18. In the Central Provinces, the Forest Survey Branch was employed on surveys in the districts of Jubbulpore, Raipur, and Chanda.

Jubbulpore District.

Jubbulpore survey

19. The Jubbulpore party under Mr. T. S. Marten took the field on the 18th November 1888 and field operations were continued in the Sonpur and Puna-

garh Pergunnahs up to the 25th April, when the forests became unhealthy and the party was obliged to return to recess-quarters.

Area surveyed.

20. The area topographically surveyed in full detail was 110 square miles, *viz.*, 100 square miles on the 4-inch scale and 10 square miles on the 16-inch scale. The latter comprised 150 miles of forest boundaries and a strip of country a few chains wide on either side of the boundaries, which was done in accordance with the Government of India orders conveyed in Revenue and Agricultural Department letter No. 1117 F., dated 8th November 1888. Triangulation was extended over an area of 352 square miles to give additional points in the interior of the forests for plane-table work, as well as for the purpose of laying down instrumental contour lines throughout the forest areas.

The Jubbulpore index map, attached hereto as Enclosure No. 2, illustrates the areas topographically surveyed.

Tests applied to work.

21. In addition to the tests applied to the work by laying down instrumental contour lines at vertical distances of 250 feet, 10 miles of linear test surveys were also run through the work.

Superintendent's inspection.

22. The Superintendent of Forest Surveys was with the Jubbulpore party from the 3rd to 9th January and again from the 8th to the 24th March.

Cost.

23. The cost of the field and office work for the year was R7,091, and the total expenditure incurred on account of forest surveys in the Jubbulpore district was R8,468; the details are given in Appendix C.

Excluding the cost of work done *in advance* of the detail survey, the cost of the season's work, estimated on the area plane-tabled, is R54-9 as against R50 in the previous year. The present year's figures include the cost of the 16-inch boundary surveys.

Raipur District.

Raipur surveys.

24. In the Raipur district field operations were carried on in the Dhamtari and Sahawa Pergunnahs. The party under Mr. James Marten took the field on the 21st November and did not return to recess-quarters till the middle of July.

Area triangulated and topographically surveyed.

25. Triangulation was extended over area of 439 square miles, 174 square miles were topographically surveyed on the scale of 4″ and 16″ = 1 mile, and 279 miles of forest boundaries were surveyed on the 16-inch scale. Fifty linear miles of levelling with the theodolite was also done in the Raipur forests.

The details of field-work are given in Appendix A, and an index map is attached as Enclosure No. 3, illustrating the areas dealt with.

Tests applied.

26. Similar tests to those applied in the Jubbulpore district were applied in the Raipur forests to check the detailed survey work.

Superintendent's inspection

27. The Superintendent was with the Raipur party from the 13th January to end of February.

28. The expenditure on account of field and office work was R10,450, and the total expenditure for the year on account of forest surveys in the Raipur district, including all charges, was R12,529.

Cost.

Estimating the cost per square mile in a similar way to that done for the Jubbulpore survey, the cost per square mile of area surveyed in detail on the 4-inch scale, including cost of the boundary survey on the 16-inch scale, is R54-6. No comparison can be drawn with the previous season's cost as this is the first year in which topographical work has been done in the Raipur district, but the cost of similar work in the Jubbulpore district has been, during the year under report, R54-9.

29. As was the case the previous season, full use was made of the revenue survey traversing in the districts of Raipur and Jubbulpore, and the data proved most valuable.

Revenue survey traversing.

Chanda District.

30. In accordance with the orders communicated in the correspondence ending with Conservator of Forests' letter No. 700, dated 3rd February 1888, a party was organized in November and deputed, under the charge of Mr. E. Litchfield, Officiating Deputy Conservator of Forests, to the Chanda district to take up the survey of the Ahiri forests.

Survey of Ahiri forests.

The area of the forests was reported by the Conservator to be about 90 square miles, and the strength of the party was accordingly fixed so as to secure the completion of the work by the close of the season. The area, however, turned out to be about one-third greater than the figures reported, and hence the completion of the work was not secured before the close of the field season.

31. Mr. E. Litchfield with the Chanda party took the field on the 27th November and remained out till the middle of June.

Duration of the field season.

32. One hundred and eighty square miles of triangulation was completed, traversing was extended over 127 square miles, 107 square miles was plane-tabled in detail on the 4-inch scale, and 70 miles of forest boundaries were surveyed on the 16-inch scale. Instrumental contour lines were laid down throughout the work, as was done in the districts of Jubbulpore and Raipur, at vertical distances of 300 feet, and other test lines were also run through the work.

Areas surveyed.

33. The survey of the Ahiri forests is still incomplete for reasons assigned in paragraph 30, but arrangements have been made to finish the work during the early part of the coming field season, when it will be possible to give the cost-rate per square mile of the completed survey. The cost of the field and office work of the season was R9,479, and the total expenditure on account of the Chanda surveys up to the close of the year is R10,356.

Cost.

34. The total amount expended during the year on account of surveys executed by the Forest Survey Branch in the districts of Jubbulpore, Raipur, and Chanda was R31,353; the details are given in Appendix C.

Total expenditure in Central Provinces.

35. In Appendix A will be found a summary of the season's field-work.

Summary of season's field-work.

North-Western Provinces.

Central Circle.

Morar and Dolmar forests.

36. The survey of the Morar and Dolmar forests, ordered in the correspondence ending with Inspector General of Forests' No. 246, dated 24th March 1888, was taken up towards the end of December and completed during the year. In addition to the survey of these forests much miscellaneous work was done in the Central Circle in the way of original boundary surveys and the fixing of boundary pillars on existing maps.

Area surveyed.

37. Triangulation was extended over an area of 31 square miles, and 13 square miles of detailed survey on the 4-inch scale was completed; the positions of 676 boundary pillars, extending over a large area, were also determined.

Cost-rate.

38. The total expenditure incurred in the Central Circle, North-Western Provinces, on account of field and office work (including map-drawing, the deduction of a vast number of areas of forest blocks and compartments not connected with the season's operations), and other miscellaneous work, was R1,959.

The cost of the season's triangulation, including computations, was R14 per square mile, and the detail survey, on the 4-inch scale, or plane-table work, cost R21 per square mile.

Superintendent's inspection.

39. The Superintendent was present with the party working in the Morar and Dolmar forests from 21st December 1888 to 2nd January 1889, and again for a few days in March.

School Circle.

Surveys in progress.

40. In the School Circle of the North-Western Provinces the survey of the Tehri-Garhwal forests, which were partly triangulated in the previous year, was continued during 1888-89, and the survey of the Karamba forests, ordered in the correspondence ending with Inspector General of Forests' letter No. 535, dated 11th July 1889, was taken in hand. The latter survey has been completed since the close of the year under report. It was not possible, however, to take up the survey of the Korwa forest, ordered in Inspector General of Forests' No. 830, dated 5th November 1888, owing to its being so detached from the rest of the work; arrangements will be made to complete the survey of this forest during 1889-90.

Area surveyed.

41. Twenty-five square miles of detail survey, on the 4-inch scale, with instrumental contour laid down at 500 feet vertical distances, were completed, and triangulation was extended, in advance, over an area of 13 square miles. Field-work could only be carried on for short periods just before and immediately after the rains.

Great difficulties have been experienced in surveying the Tehri-Garhwal and Jaunsar forests, as they are scattered over a considerable area of country in detached blocks, and are for the most part situated at high altitudes and are difficult to get at. Labour is scarce in the neighbourhood of the forests, and it is difficult to obtain ordinary supplies for camp followers.

Cost-rate.

42. The amount expended on field and office work for surveys in the School Circle was R1,748, and, including charges for all work done in the Circle, the total

expenditure was R1,995. The Surveyors were still in the field at the close of the survey year, and as it is expected that the Tehri-Garhwal and Jaunsar work will be completed early in the coming field season, the final cost-rate can be given in next annual report.

Total expenditure on surveys in North-Western Provinces.

43. The total expenditure incurred in the North-Western Provinces on account of Forest Surveys was R3,954, *viz.*, in the Central Circle R1,959 and the School Circle R1,995.

A summary of the outturn of field-work and computation is given in Appendix A, and the details of expenditure are given in Appendix C.

BERAR.

Melghat area surveyed.

44. In the Melghat a small area of 8 square miles, which had inadvertently been omitted the previous year, was surveyed partly on the 4-inch and partly on the 2-inch scales.

Western boundary of the Melghat pending settlement.

45. It is desirable that attention should be called to the boundary question brought forward in paragraph 14 of last year's Annual Progress Report, as the western boundary of the Melghat is still an open question, the settlement of which is delaying the publication of the Melghat maps which contain this boundary.

Expenditure.

46. An expenditure of R5,206 was incurred during the financial year 1888-89 and adjusted in the Berar suspense accounts of the year. The expenditure was chiefly on account of completing field-work in the Melghat, map-drawing, and payments made to the Survey of India Department on account of printing and publishing maps (see Appendix D).

A further sum of R4,679 was expended since the close of the financial year, chiefly due to payments made to the Survey of India Department on account of publishing maps, &c., and to the vast amount of map-drawing and heavy work in deducing field areas, as well as other miscellaneous work.

BENGAL.

Singbhoom.

47. The demarcation of the southern boundary of the Singbhoom forests touching on Keonjhur is still incomplete, and until it is reported ready for survey a complete set of boundary maps of the Singbhoom forests cannot be prepared. The Superintendent of the Orissa Tributary Mehals, in his letter No. 316, dated 13th March 1889, informed the Conservator of Forests, Bengal, "that Government has been asked to depute a professional Surveyor to demarcate the boundary between Keonjhur and Singbhoom and orders are awaited."

Expenditure.

48. A sum of R780 was expended during the year chiefly on account of printing and publishing 4″ sheets of the Singbhoom survey.

OFFICE WORK.

Computations.

49. In Appendix A will be found an abstract of the outturn of the season's computations. The number of triangles computed in duplicate was 970 and the rectangular co-ordinates of 849 trigonometrical stations were deduced. To determine the heights of 555 stations above sea-level, 1,191 triangles were com-

puted in duplicate. The rectangular co-ordinates of 938 traverse stations were computed in duplicate and the rectangular co-ordinate values of 4,656 traverse stations were converted from Revenue to Forest Survey "origin." The latitudinal and longitudinal values of 188 stations of the Great Trigonometrical Survey were converted into rectangular co-ordinates; from 4,146 observations taken with the tangent scale clinometer the heights above sea-level of 1,737 points were computed, and abstracts were prepared in duplicate from triangulation field books of 4,708 horizontal angles.

Areas.

50. The areas of 3,056 fields in the Melghat have been deduced in duplicate, as well as the areas of 291 villages, and detailed area statements of the new compartments and blocks of the Kumaun and Garhwal forests have been prepared for 81 4-inch standard sheets.

Map-Drawing.

Appendix B.

51. A summary of the original drawings under preparation during the year as well as other miscellaneous office work is given in Appendix B.

North-Western Provinces and Oudh.

52. Copies of the six standard sheets of Kumaun and Garhwal sheets on the 4-inch scale, reported last year as having been sent to press, have been received and two sheets of the same series reduced to the 2-inch scale have been published. Two charts of triangulation and traversing on the 1-inch scale have been published, and two others on the same scale have been sent to the press. The drawing of two index maps of the Kumaun and Garhwal forests on the scale of 1″ = 1 mile and 1″ = 4 miles have been completed, as well as an area table with figures corresponding to the areas of the blocks and compartments shown on the index map.

Six standard sheets of the Kheri forests, prepared for "Working-Plans" purposes, have been published.

Punjab.

53. For the Punjab, 7 maps of the Chamba forests on the scale of 2″=1 mile have been passed through the press; an index map of Bashahr on the scale of 1″ = 4 miles has been published; ten standard sheets of the Bashahr survey on the 4-inch scale are in progress, and one is in the press.

Assam.

54. A map on the scale of 4″=1 mile of the Dambu Reserve in the Garo Hills Division of Assam is in progress.

Bengal.

55. Of the Bengal standard maps, 10 boundary sheets of the Singbhoom forests on the 4-inch scale have been published during the year, and ten sheets are well advanced towards completion. A map of the Bamanpokri forest in the Darjeeling Division has been published on the scale of 8″=1 mile.

Berar.

56. Six standard sheets of the Melghat survey on the 4-inch scale and two sheets on the 2-inch scale have been published; 11 sheets on the 4-inch scale have been completed during the year and sent to press, and eight 4-inch sheets are approaching completion. Three standard sheets on the 2-inch scale have also been sent to press and six sheets on a similar scale are well advanced for publication, and, with the exception of those sheets containing the unsettled portion of the Melghat boundary, all the above maps should be in the press

within the next few months. Three maps on the scale of 4″=1 mile of black soil villages, and a map of the Daryapur taluk on the scale of 1″=1 mile, as well as 7 charts of triangulation and traversing of the Melghat survey, have been sent to press.

Central Provinces.

57. An index map to the Forest Survey of the Bhandara district was drawn on the scale of 1″ = 4 miles, and the drawing of standard sheet No. 187 $\frac{S.W}{3}$ (Raipur district) on the scale of 4″=1 mile is in progress. Sheet No. 107 $\frac{S.W.}{1}$ (Jubbulpore district) on the scale of 4″=1 mile is also in progress.

Burma.

58. A map on the scale of 1″=1 mile of Bernardmyo and the Ruby Mines in Upper Burma was published, as well as a map on the same scale of the forests of Maingwun, Pyaungthwe, and Yabin.

Forest Map of India.

59. The Forest Map of India, reported in paragraph 47 of last Annual Report as being under compilation, is now in the press; the proof is expected in February next.

Tracings and other miscellaneous work.

60. For the Forest Department and various district officers 52 tracings were made, 485 printed maps were cut up and mounted in book form, and 1,824 printed maps were coloured.

List of best available printed maps for forest purposes.

61. The detailed list of best available printed maps of the Reserved, Protected, and Unclassed Forests in the several Provinces under the Government of India have continued to be revised, and complete lists of maps for the Pegu and Tenasserim Circles of Lower Burma have been prepared and passed through the press.

Forest School Students.

Drawing classes.

62. Drawing classes, as heretofore, were held at the Forest School, at which 38 students attended. The hours of attendance were from 7 to 8½ A.M., and the instructors were Messrs. T. and James Marten and A. Descubes, assistants of the Forest Survey Branch.

Field instruction in surveying.

63. Field instruction in surveying to first year's students was given by Dr. Warth, one of the Forest School Officers; it occupied a period from November 1888 to February 1889.

Examinations.

64. In November 1888, the students who had completed their course in surveying were examined by the Superintendent of Forest Surveys; 25 passed the required standard and received certificates of qualifications in surveying by the lower standard as laid down in paragraph 52 of the 3rd edition of the Forest Department Code.

Expenditure during the year.

65. The total expenditure for the year incurred by the Forest Survey Branch in the several Provinces in which survey operations were in progress, as well as for work not connected with these surveys, amounts to R78,988, against R75,698 in 1887-88 and R75,423 in 1886-87.

Appendix C exhibits the expenditure for the year under Provincial headings, and Appendix D shows the amounts already adjusted in the Berar suspense accounts during the financial year 1888-89. The total figures in these statements have already been referred to under head of "Expenditure and cost-rates" in each of the Provinces to which the expenditure refers.

Appendices C and D.

Officers of the Superior Staff.

66. Mr. W. H. Reynolds, Superintendent of Forest Surveys, held charge of the Forest Surveys throughout the year. From the 17th November to 9th December he was at Phanduwala with the Forest School students examining them in surveying; on the 20th December he proceeded to the Naini Tal Division and started the survey of the Morar and Dolmar forests completing the triangulation himself. He then proceeded to Jubbulpore and was with the Jubbulpore party from the 2nd to 9th January, after which he joined the Raipur party and remained with that party until the 26th February, when his presence was again required at Jubbulpore. He remained with the Jubbulpore party from the 8th to the 24th March and then returned to head-quarters on the 1st April, having inspected, *en route*, the work in the Morar forests. On the 17th April, Mr. Reynolds started for Bashahr and was supervising the work of the Bashahr party up to the setting in of the rains. He then returned to his head-quarters, arriving at Dehra on the 6th July. From early in July to the end of August, he was at the head-quarters office supervising the season's computations, plotting and map-drawing, &c., and before the close of the survey year he again visited the Bashahr party.

Mr W. H Reynolds, Superintendent, Forest Surveys

67. Mr. E. Litchfield, Deputy Conservator of Forests, was employed throughout the field season on the survey of the Ahiri forests in the Chanda district of the Central Provinces. He started from Dehra on the 16th November and by the end of the month he had commenced his field-work. He was in the field until the end of June and returned to recess-quarters at Dehra on the 2nd July. During the recess season he was employed chiefly on map-drawing, and completed about three-fourths of a full standard sheet of the Melghat on the 2-inch scale. Mr. Litchfield is a good field surveyor and draughtsman and succeeded, under difficulties, in turning out an adequate season's field-work, but he requires to master more thoroughly the computation portion of his work.

Mr E. Litchfield, Deputy Conservator of Forests, 4th grade.

Mr. E. Litchfield was promoted to the 4th grade of Deputy Conservators on the 1st January 1889.

Forest Surveyors.

68. In Government of India, Finance and Commerce Department, Resolution No. 3152, dated 6th July 1889, an arrangement was sanctioned to transfer to the Survey of India Department list the names of the assistants in the upper subordinate grades, in accordance with the dates of their appointments to the Forest Survey Branch, and hence Mr. T. S. Marten's name has been placed in the Survey list between Messrs. Peters and Prunty, and Mr. James Marten's between Messrs. Berkeley and Tate.

Upper Subordinate Establishment.

The two junior assistants, Messrs. Nichol and C. Litchfield, who were appointed to the Survey Branch towards the end of 1888, will be transferred to the Survey of India list after they pass the qualifying examination required by the Survey Department.

Mr. T. S. Marten.

69. Mr. T. Marten was in charge of the Jubbulpore field-work from the middle of November to the end of April. He was employed chiefly on the detail survey of the Reserved Forests in the Pergunnahs of Sonpur and Punagarh. He fell ill with fever about the middle of April, and consequently had to return to head-quarters, where he arrived on the 30th. In May he was deputed to supervise the surveys in Tehri-Garhwal and returned to recess-quarters at Dehra on the 29th June. Mr. T. Marten is a quick worker and turns out excellent work at times, but his outturn of work in Tehri-Garhwal was somewhat disappointing. During the recess months, he was employed in preparing the fair drawings of forest maps for publication.

Mr. T. S. Marten was promoted from R230 to R250 a month on 6th October 1888.

Mr. James Marten.

70. Mr. James Marten, who had been employed the previous season on the surveys in Berar, was, during the year under report, employed on the detail survey of the Reserved Forests in the Raipur district. He left Dehra on the 18th November, and was in the field until the beginning of July. He was employed during the recess months chiefly in bringing up the fair drawings of the standard sheets for publication.

Mr. James Marten has worked hard and well, and succeeded in turning out a satisfactory season's field-work.

He was promoted from R200 to R230 a month on 6th July 1889.

Mr. A. Descubes.

71. Mr. Descubes has, throughout the year, been employed in the Drawing Office at Dehra, chiefly in preparing special maps and area statements for forest purposes, and in posting and correcting forest information on sets of provincial maps on various scales. It has already been remarked that the special work entrusted to Mr. Descubes is of a most laborious character and requires the entire attention of an intelligent assistant to prevent its falling into arrears. Mr. Descubes has conducted his work most ably; he is a most energetic and hard-working assistant and a specially talented draughtsman.

He has been recommended for promotion, which he well deserves, and which it is hoped he will soon be rewarded with.

Mr. C. Litchfield.

72. Mr. C. Litchfield was appointed to the Forest Survey Branch as a junior assistant on the 14th November 1888. During the field season he was attached to the Chanda party to learn field-work, and before the close of the season was able to make himself useful by surveying with the plane-table a small topographical area. He was with the Chanda party from the end of November to the end of June, and returned to head-quarters on the 2nd July. During the recess months, he was employed chiefly on deducing areas and in making himself acquainted with office work.

He is a promising assistant and is likely to make a good plane-tabler.

Mr. J. H. Nichol.

73. Mr. Nichol joined the Forest Survey Branch from the Roorkee College; he was appointed a junior assistant on the 16th December. Towards the end

of December he accompanied the Superintendent of Forest Surveys to the Naini Tal Division and learnt the system of conducting triangulation. From January to the middle of April he was learning triangulation in the Jubbulpore district and succeeded, before the hot weather set in, to complete some independent work. From the beginning of May to the close of the survey year he was employed on triangulation in the Bashahr State and turned out a fair amount of good work for a beginner.

He is a very promising young assistant.

SUB-SURVEYORS.

Strength of Native Establishment.

74. The average strength of the Native Establishment employed during the field season on each kind of work was—

Triangulation	1
Traversing	1
Plotting and computing	10
Plane-tabling	23
In the field	35
At head-quarters	23
TOTAL	58

Services of Native Establishment.

75. On the whole, the Native Establishment worked exceedingly well, both in the field and in office. Salig Ram is a good field hand and turned out a large triangulated area in the Raipur district, as well as in Bashahr; Bhup Singh is an excellent plane-tabler and did good work in Bashahr; Tulsi Ram, Jadu Nath, and Gunput Rai are good draughtsmen and deserve mention for their neat work. As computers Badri Dutt and Jewa Singh are good and steady workers; Kali Kanth Kar, the head clerk of the correspondence office, is a very intelligent and hard-working office assistant; and E. MacMaster is also a good office hand.

Health of Establishment.

76. During the early part of the field season the health of the establishment was fairly good, but in April the Jubbulpore party, owing to an outbreak of fever, had to close work earlier than usual. The Chanda party also suffered from fever towards the close of the field season, and one of the men died immediately after his return to recess-quarters. In the Raipur district there was an outbreak of cholera which tended to retard the work somewhat.

Work done by the Survey of India for the Forest Survey Branch.

77. The Forest Survey maps continue to be photo-zincographed at the office of the Trigonometrical Branch of the Survey of India Department, and the work is always done in a most creditable manner.

The cost of work done by the Survey of India for the Forest Survey Branch, including cost of maps received from Calcutta, was R3,011.

The Superintendent wishes to acknowledge the assistance he has received from Mr. Cooke, Deputy Superintendent of Survey, for so promptly furnishing traverse data for the survey of the forest blocks in the Jubbulpore and Bhandara districts.

Documents accompanying the Report.

78. The following documents are appended to this Report :—

(1) Index Map to the Forest Survey of Bashahr, Punjab, scale 1″=4 miles.

(2) Index Map to the Forest Survey of District Jubbulpore, Central Provinces, scale 8 miles = 1″.

(3) Index Map to the Forest Survey of District Raipur, Central Provinces, scale 8 miles=1″.

(4) Appendix A.—Summary of outturn of field-work and computations

(5) Appendix B.—Summary of outturn of drawing and miscellaneous work.

(6) Appendix C.—Summary of Expenditure from 1st October 1888 to 30th September 1889, showing the amounts expended on field and office work (Imperial).

(7) Appendix D.—Summary of Expenditure from 1st October 1888 to 31st March 1889, showing the amounts expended on field and office work (Berar).

(8) Appendix E.—Area topographically surveyed by the Forest Survey Department during 1888-89.

(9) Annual Form No. 58.—Summary of Revenue and Expenditure (Imperial Surveys) during the Financial year.

(10) Annual Form No. 58.—Summary of Revenue and Expenditure (Berar Surveys) during the Financial year.

(11) Annual Form No. 59.—Account Current.

(12) Annual Form No. 61.—Revenue received and Outstandings on account of Revenue.

DEHRA DUN,

2nd December 1889.

W. H. REYNOLDS,

Superintendent of Forest Surveys.

APPENDIX A.

Summary of Outturn of Field Work and Computations by the Forest Survey Department, from 1st October 1888 to 30th September 1889.

No.	North-Western Provinces, Punjab, Berar, and Central Provinces Surveys.		Amount.	Remarks.
	Plane-tabling.			
1	Area plane-tabled on the scale of 4″ = 1 mile—			
	(*a*) Melghat—Berar	5		
	(*b*) Bashahr—Punjab	215		
	(*c*) Morar and Dolmar—Central Circle, North-Western Provinces . .	13		
	(*d*) Tehri-Garhwal—School Circle, North-Western Provinces . . .	25		
	(*e*) Jubbulpore—Central Provinces . .	100		
	(*f*) Raipur " " . .	157		
	(*g*) Chanda " " . .	102		
		617		
	Area plane-tabled on the scale of 2″ = 1 mile—			
	Melghat—Berar	3		
	Area plane-tabled on the scale of 16″ = 1 mile—		652	Square miles.
	(*a*) Jubbulpore—Central Provinces . .	10		
	(*b*) Raipur " " . .	17		
	(*c*) Chanda " " . .	5		
		32		
2	Boundary Surveys on 16″ scale (linear)—			
	(*a*) Jubbulpore—Central Provinces . .	150		
	(*b*) Raipur " " . .	279	499	Linear miles.
	(*c*) Chanda " " . .	70		
3	Boundary Surveys on 4″ scale—			
	Ninglat and Gogar Forests—Central Circle, North-Western Provinces		676	Pillars.

No.	North-Western Provinces, Punjab, Berar, and Central Provinces Surveys.		Amount.	Remarks
	Triangulation.			
4	Area triangulated—			
	(*a*) Bashahr—Punjab	889		
	(*b*) Morar—Central Circle, N.-W. P. .	31		
	(*c*) Karamba—Jaunsar, School Circle, N.-W. P.	13	1,904	Square miles.
	(*d*) Jubbulpore—Central Provinces . .	352		
	(*e*) Raipur " " . .	439		
	(*f*) Chanda " " . .	180		
5	Number of points fixed—			
	(*a*) Bashahr—Punjab	550		
	(*b*) Morar—Central Circle, N.-W. P. . .	20		
	(*c*) Karamba—Jaunsar, School Circle, N.-W. P.	22	1,217	
	(*d*) Jubbulpore—Central Provinces . .	122		
	(*e*) Raipur " " . .	466		
	(*f*) Chanda " " . .	37		
6	Number of Plane-table stations in area surveyed—			
	(*a*) Melghat—Berar	680		
	(*b*) Bashahr—Punjab	20,018		
	(*c*) Morar and Dolmar—Central Circle, North-Western Provinces . .	1,789		
	(*d*) Tehri-Garhwal—School Circle, North-Western Provinces	2,328	95,967	
	(*e*) Jubbulpore—Central Provinces . .	17,011		
	(*f*) Raipur " " . .	33,411		
	(*g*) Chanda " " . .	20,730		
7	Number of Plane-table stations for testing works—			
	(*a*) Melghat—Berar	19		
	(*b*) Bashahr—Punjab	1,094		
	(*c*) Morar and Dolmar—Central Circle, North-Western Provinces . . .	1,789		
	(*d*) Tehri-Garhwal—School Circle, North-Western Provinces . . .	190	10,251	
	(*e*) Jubbulpore—Central Provinces . .	1,722		
	(*f*) Raipur " " . .	4,204		
	(*g*) Chanda " " . .	1,233		

No.	North-Western Provinces, Punjab, Berar, and Central Provinces Surveys.		Amount.	Remarks.
	Traversing.			
8	Area traversed—			
	Chanda—Central Provinces		127	Square miles.
9	Number of linear miles traversed—			
	Chanda—Central Provinces		140	
10	Number of traverse stations—			
	Chanda—Central Provinces		938	
11	Check Surveys or "Partals"—			
	(a) Bashahr—Punjab	6	96	Miles.
	(b) Jubbulpore—Central Provinces . .	10		
	(c) Raipur " " . .	76		
	(d) Chanda " " . .	4		
	Levelling.			
12	Levelling with theodolite—Raipur, Central Provinces .		50	Linear miles.
	Computations.			
13	Number of stations the co-ordinate value of which were converted from Revenue to Forest Survey "origin" .		4,656	
14	Number of triangles worked in duplicate—			
	(a) Naini Tal—Central Circle, North-Western Provinces	33	970	
	(b) Karamba and Tehri-Garhwal—School Circle, North-Western Provinces .	274		
	(c) Jubbulpore—Central Provinces . .	85		
	(d) Raipur " " . .	513		
	(e) Chanda " " . .	65		
15	Number of points fixed thereby and of which the rectangular co ordinates have been computed in duplicate—			
	(a) Naini Tal—Central Circle, North-Western Provinces	19	849	
	(b) Karamba and Tehri-Garhwal—School Circle, North-Western Provinces .	187		
	(c) Jubbulpore—Central Provinces . .	200		
	(d) Raipur " " . .	360		
	(e) Chanda " " . .	83		

No.	North-Western Provinces, Punjab, Berar, and Central Provinces Surveys.		Amount.	Remarks.
16	Number of triangles worked in duplicate to determine heights—			
	(a) Naini Tal—Central Circle, N.-W.-P.	38	1,191	
	(b) Karamba and Tehri-Garhwal—School Circle, North-Western Provinces	288		
	(c) Jubbulpore—Central Provinces	215		
	(d) Raipur " "	590		
	(e) Chanda " "	60		
17	Number of points of which the heights were determined thereby—			
	(a) Naini Tal—Central Circle, N.-W. P.	19	555	
	(b) Karamba and Tehri-Garhwal,—School Circle, North-Western Provinces	144		
	(c) Jubbulpore—Central Provinces	117		
	(d) Raipur " "	245		
	(e) Chanda " "	30		
18	Abstract of horizontal angles in duplicate—			
	(a) Naini Tal—Central Circle, N.-W. P.	67	4,708	
	(b) Bashahr—Punjab	1,499		
	(c) Jubbulpore—Central Provinces	307		
	(d) Raipur " "	2,618		
	(e) Chanda " "	217		
19	Number of G. T. Survey stations computed in duplicate—			
	(a) Bashahr—Punjab	138	188	
	(b) Jubbulpore—Central Provinces	4		
	(c) Raipur " "	46		
20	Number of tangent scale clinometer observations—			
	(a) Melghat—Berar	93	4,116	
	(b) Bashahr—Punjab	2,282		
	(c) Tehri-Garhwal—School Circle, N.-W. P.	160		
	(d) Jubbulpore—Central Provinces	364		
	(e) Raipur " "	796		
	(f) Chanda " "	451		

No.	North-Western Provinces, Punjab, Berar, and Central Provinces Surveys.	Amount.	Remarks.
21	Number of heights determined by tangent scale clinometer—		
	(a) Melghat—Berar 35		
	(b) Bashahr—Punjab 906		
	(c) Tehri-Garhwal—School Circle, North-Western Provinces. 85	1,737	
	(d) Jubbulpore—Central Provinces . 188		
	(e) Raipur " " 276		
	(f) Chanda " " 247		
	Areas.		
22	Areas computed—		
	Melghat—Berar fields	3,056	
	" " villages	291	
	Kumaun and Garhwal Forests, standard sheets . .	81	

APPENDIX B.

Summary of Outturn of Drawing and Miscellaneous Works executed by the Forest Survey Department, from 1st October 1888 to 30th September 1889.

No.	Particulars.	Number of Sheets.	Remarks.
	Original Drawings.		
	North-Western Provinces and Oudh.		
1	Kumaun and Garhwal Sheets, scale 4″=1 mile, Nos. III, VI, VII, XI, LXXV, and LXXVI (published).	6	
2	Kumaun and Garhwal Sheets, scale 2″=1 mile, Nos. XXX and LXIII (published).	2	
3	Chart of Kumaun and Garhwal Triangulation, scale 1″= 1 mile, Nos. I and IV (published).	2	
4	Chart of Kumaun and Garhwal Triangulation, scale 1″= 1 mile, Nos. VI and VIII (No. VIII sent to press).	2	
5	Index Map showing the blocks and compartments of Kumaun and Garhwal proposed Working-Plans, scale 1″=1 mile.	1	
6	Index Map of Kumaun and Garhwal with part of Bijnour, showing new forest blocks of 1886, scale 1″=4 miles.	1	
7	Area statement of Kumaun and Garhwal Forest Survey .	1	
8	Government Forests in the District of Kheri (Oudh), Sheets Nos. 113 N. W., 113 S. W., 113 S. E, 114 N.W., 114 N. E., and 114 S. E., scale 2″=1 mile (published.)	6	
	Punjab.		
9	Map of the Chamba Forests, scale 2″=1 mile, Nos. 1 to 7 (published).	7	

No.	Particulars.	Number of Sheets.	REMARKS.
10	Index Map to the Forest Survey of Bashahr, scale 4 miles = 1″ (published).	1	
11	Maps of the Government Forests in the District of Simla, Punjab, Sheets Nos. 331 S. E./4, 346 S. E./1, 346 S. W./1, 346 S. E./2, 346 S. W./3, 346 S. W./4, 347 N. E./1, 347 N. W./2, 347 N. E./2, 347 N. W./4, scale 4″ = 1 mile (in progress).	10	
12	Map of the Government Forests in the District of Simla, Punjab, Sheet No. 332 S. W./3, scale 4″ = 1 mile (sent to press).	1	
	Assam.		
13	Map of the Dambu Reserve, Garo Hills Division, scale 4″ = 1 mile (in progress).	1	
	Bengal.		
14	Maps of the Government Forests in the Chota Nagpur Division, Singbhoom, scale 4″ = 1 mile, Sheets Nos. 127 N. E./1, 127 S. E./1, 127 S. E./2, 127 S. W./2, 127 S. E./3, 127 S. E./4, 156 S. W./3, 157 N. W./1, 158 N. W./1, 158 S. W./3 (published).	10	
15	Maps of the Government Forests in the Chota Nagpur Division, Singbhoom, scale 4″ = 1 mile, Sheets Nos. 125 S. E./2, 125 S. E./4, 126 S. E./1, 126 S. E./2, 126 N. E./2, 126 N. W./2, 126 N. E./3, 126 N. E./4, 127 S. W./4, 157 N. W./3. (in progress).	10	
16	Map of the Bamanpokri Forest Reserve, Kurseong Sub-division, Bengal, scale 8″ = 1 mile (published).	1	
	Berar.		
17	Maps of the Melghat Taluk, District Ellichpur, Berar, scale 4″ = 1 mile, Sheets Nos. 19 N. W./1, 19 N. W./2, 26 S. W./1, 26 S. W./3, 26 N. W./3, and 26 S. W./4 (published).	6	
18	Maps of the Melghat Taluk, District Ellichpur, Berar, scale 2″ = 1 mile, Sheets Nos. 20 N. E., 20 A. N. E. (published).	2	
19	Maps of the Melghat Taluk, District Ellichpur, Berar, scale 4″ = 1 mile, Sheets Nos. 12 S. E./1, 12 S. E./1, 19 S. W./1, 19 N. E./1, 19 N. E./2, 19 N. W./3, 19 S. W./3, 19 S. W./4, 19 N. W./4, 20 N. W./1, and 20 N. W./2. (sent to press).	10	
20	Maps of the Melghat Taluk, District Ellichpur, Berar, scale 4″ = 1 mile, Sheets Nos. 12 S. E./2, 12 S. E./3, 13 N. E./1, 13 N. E./2, 14 N. W./3, 19 S. W./2, and 20 A. N. W. and 14 N. E. (in two parts) (in progress).	8	
21	Map containing the black soil village of Raipur, part of Sheet No. 19, scale 4″ = 1 mile (sent to press).	1	
22	Map containing the black soil village of Kharimal, part of Sheet No. 19, scale 4″ = 1 mile (sent to press).	1	

No.	Particulars.	Number of Sheets.	REMARKS.
23	Map containing the black soil village of Chourakund, part of Sheet No. 19, scale 4″=1 mile (sent to press).	1	
24	Maps of the Melghat Taluk, District Ellichpur, Berar, scale 2″=1 mile, Sheets Nos. 19 S. E., 19 N. E., and 20 N. W. (sent to press.)	3	
25	Maps of the Melghat Taluk, District Ellichpur, Berar, scale 2″=1 mile, Sheets Nos. 13 N. E., 13 S. E., 13 S. W., and 14 N. W.; 14 N. E., 19 N. W. and S. W., and 20 A. N. W. (in progress).	6	
26	Map of Dariapur Taluk, Berar, scale 1″=1 mile (sent to press).	1	
27	Chart of Melghat Triangulations, Nos. 12, 13, 19, 20, 20A., 26, and 27, scale 1″=1 mile (sent to press).	7	
28	Chart of Melghat Triangulations, No. 14, scale 1″=1 mile (in progress).	1	
	Central Provinces.		
29	Index Map to the Forest Survey of District Bhandara, scale 4 miles=1″ (in progress).	1	
30	Map of the Government Forests in the District of Jubbulpore, Sheet No. 107 $\frac{S.W.}{4}$, scale 4″=1 mile (in progress).	1	
31	Map of the Government Forests in the District of Raipur, Sheet No. 187 $\frac{S.W.}{3}$, scale 4″=1 mile (in progress).	1	
	Burma.		
32	Map of the Forests of Bernardmyo and Ruby Mines valleys (1888), part of Upper Burma, scale 1″=1 mile (published).	1	
33	Map of the Maingwun, Pyaungthwe and Yabin Forests, Yeu District, scale 1″=1 mile (published).	1	
	India.		
34	Forest Map of India showing Reserved and Protected Forests corrected up to 1st April 1888, scale 1″=48 miles (in press).	1	
	Tracings made.		
35	Tracings made for various Forest and District Officers	52	
	Map-colouring.		
36	Printed maps of various kinds coloured	1,824	
	Mounted Maps.		
37	Printed maps mounted in book form	485	
	List of best available printed Maps.		
38	Lists of best available printed maps of Reserved Forests of Pegu and Tenasserim Circles of Lower Burma.	2	

APPENDIX C.

Summary of Expenditure from 1st October 1888, to 30th September 1889, showing the amounts expended on Field and Office Work of the Forest Surveys (Imperial).

No.	Month.	North-Western Provinces.						Punjab.			Bengal.		Central Provinces.									Berar.			Imperial.	Grand Total.	Remarks.
		Central Circle, Kumaun and Naini Tal.			School Circle, Jaunsar and Tehri-Garhwal.			Bashahr.			Singbhoom.		Jubbulpore.			Raipur.			Chanda.			Melghat.					
		Field.	Office.	General.	Field.	Office.	General.	Field.	Office.	General.	Office.	General.	Field.	Office.	General.	Field.	Office.	General.	Field.	Office.	General.	Field.	Office.	General.			
		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
1	October 1888	...	98	55	...	.		...	...	302	14	211	...	25	110	..	95	100	60	...	...	...		...	1,772	2,842	
2	November „	...	63	68	.	...	...	...		125	24	316	...	7	305	...	109	320	122	13	...	...	...	...	1,258	2,730	
3	December „	...	10	96	...	.	39	39	.	188	...	...	892	57	117	584	33	107	651	52	40	...	...	...	1,477	4,382	
4	January 1889	215	50	528	...	...		..	14	150	...	...	964	...	90	2,536	25	162	1,249	12	37	...	...	...	1,623	7,655	
5	February „	231	...	...	...	...	...		20	100	...	...	1,107	...	125	1,661	25	264	1,372	...	200	...	...	...	1,051	6,156	
6	March „	...	...	...	...	...	...	2,321	12	100	..	...	1,823	...	333	1,066	25	1,126	1,262	27	120	...	...	...	1,355	9,570	
7	April „	...	...	..	..	...	38	846	80	166	...	...	1,082	32	50	903	...	...	500	50	...	...	110	623	1,681	6,161	
8	May „	98	...	52	18	...	52	1,018	115	753	..	...	976	25	74	1,213	...	..	1,548	12	280	...	246	89	2,548	9,117	
9	June „	61	...	50	423	6	50	237	139	592	...	...	...	1	...	...	26	...	1,145	..	200	...	183	50	1,639	4,802	
10	July „	100	15	97	1,301	...	50	766	107	1,065	...	...	45	3	73	59	27	...	1,364	...	...	...	131	98	1,891	7,192	
11	August „	9	...	...	...	...	...	421	151	200	...	80	...	2	100	1,939	57	...	...	35	...	7	1,265	262	2,601	7,129	
12	September „	...	63	..	...	...	16	2,282	30	292	135	...	...	50	...	...	67	...	...	5	...	...	1,477	138	1,489	6,046	
	Total	714	299	946	1,742	6	247	7,930	668	4,033	173	607	6,889	202	1,377	9,961	489	2,079	9,273	206	877	7	3,412	1,260	20,385	73,782	
		1,959			1,995			12,631			780		8,468			12,529			10,356			4,679			20,385	73,782	
		3,954						12,631			780		31,353									4,679			20,385	73,782	

APPENDIX D.

Summary of Expenditure from 1st October 1888 to 31st March 1889, showing the amount expended on Field and Office Work of the Forest Surveys (Berar).

No.	Month.	Field.	Office.	General.	Total.	Remarks.
		R	R	R	R	
1	October 1888	89	1,096	833	2,018	
2	November „	...	1,297	...	1,297	
3	December „	...	519	400	919	
4	January 1889	...	105	258	363	
5	February „	...	60	...	60	
6	March „	238	222	89	549	For expenditure from April to September 1889 see Imperial Statement (Appendix C).
	Total	327	3,299	1,580	5,206	

APPENDIX E.

Area topographically surveyed by the Forest Survey Department during 1888-89.

No.	Province or District.		Area, in square miles.		Total.	Remarks.
			Demarcated forests.	Undemarcated forests and other lands.		
1	Berar—Melghat		8	...	8	
2	Central Provinces.	Raipur	174	...	174	
		Jubbulpore	110	...	110	
		Chanda	107	...	107	
3	Punjab—Bashahr		44	171	215	All forests in Bashahr, whether demarcated or not, are held in lease by the Punjab Government.
4	North-Western Provinces	Tehri-Garhwal	25	...	25	
		Morar and Dolmar	13	.	13	
	Total		481	171	652	

FORM No. 58.

Summary of Revenue and Expenditure of the Forest Surveys (Imperial) during 1888-89.

Receipts.

	R	a.	p.
I.—Timber and other Produce removed from the forests by Government agency:—			
a. Timber	...		
b. Firewood and Charcoal	...		
c. Bamboos	...		
d. Sandal-wood	...		
e. Grass and other Minor Produce	...		
II.—Timber and other Produce removed from the forests by Consumers or Purchasers:—			
a. Timber	...		
b. Firewood and Charcoal	...		
c. Bamboos	...		
d. Grazing and Fodder Grass	...		
e. Other Minor Produce	...		
III.—Drift and waif Wood and confiscated Forest Produce	...		
IV.—Revenue from forests not managed by Government:—			
a. Duty on Foreign Timber and other Forest Produce	...		
b. Revenue from Shared and Private Forests	...		
V.—Miscellaneous:—			
a. Fines and Forfeitures	...		
b. Refunds	...		
c. Other sources	315	0	0
Total Receipts	315	0	0

Expenditure.

A.—Conservancy and Works.

	R	a.	p.
I.—Timber and other Produce removed from the forests by Government agency:—			
a. Timber	...		
b. Firewood and Charcoal	...		
c. Bamboos	...		
d. Sandal-wood	...		
e. Grass and other Minor Produce	...		
II.—Timber and other Produce removed from the forests by Consumers or Purchasers	...		
III.—Drift and waif Wood and confiscated Forest Produce	...		
IV.—Revenue from forests not managed by Government:—			
a. Duty on Foreign Timber and other Forest Produce	...		
b. Revenue from Shared and Private Forests	...		
Carried over	...		

FORM No. 58—*continued.*

Summary of Revenue and Expenditure of the Forest Surveys (Imperial) during 1888-89—contd.

Expenditure—*continued.*

A.—CONSERVANCY AND WORKS—*continued.*

	R	a.	p.
Brought forward	...		
V.—Rent of Leased Forests and Payments to Shareholders in forests managed by Government	...		
VI.—Live Stock, Stores, Tools and Plant :—			
a. Purchase of Cattle	...		
b. Feed and Keep of Cattle	716	5	2
c. Purchase of Stores, Tools and Plant	1,572	14	0
VII.—Communications and Buildings :—			
a. Roads and Bridges	...		
b. Buildings	...		
c. Other Works	...		
VIII.—Demarcation, Improvement, and Extension of Forests :—			
a. Demarcation	...		
b. Compensation for Land and Rights	...		
c. Surveys and Working-Plans	4,439	2	4
d. Sowing and Planting	...		
e. Protection from Fire	...		
f. Other Works	...		
IX.—Miscellaneous :—			
a. Refunds	303	2	8
b. Law Charges	..		
c. Other Charges	2,000	8	5
TOTAL A.—CONSERVANCY AND WORKS	9,032	0	7

B.—ESTABLISHMENTS.

I.—Salaries :—			
a. Conservators	...		
b. Superior Officers	9,712	9	1
c/1. Upper Subordinate Establishments	3,704	0	7
c/2. Lower Subordinate Establishments	5,988	1	3
e. Deputation and Special Allowances	...		
II.—Travelling Allowances :—			
a. Conservators	...		
b. Superior Officers	2,000	9	0
c/1. Upper Subordinate Establishments	1,143	15	4
c/2. Lower Subordinate Establishments	2,387	0	2
III.—Contingencies :—			
a. Stationery	3	8	6
b. Carriage of Tents and Records	835	1	6

FORM No. 58—*continued.*

Summary of Revenue and Expenditure of the Forest Surveys (Imperial) during 1888-89—concld.

Expenditure—*concluded.*

B.—ESTABLISHMENTS—*continued.*

	R	a.	p.
c. Rents, Rates, and Taxes	...		
d. Pay of Police Guards	...		
e. Official Postage	383	12	6
f. Sundries	1,126	3	8
TOTAL B.—ESTABLISHMENTS	27,284	13	7
Grand Total of Expenditure	36,316	14	2

Summary of Revenue and Expenditure of the Forest Survey Branch, Berar Division, during 1888-89.

Receipts.

	R	a.	p.
I.—Timber and other Produce removed from the forests by Government agency:—			
a. Timber	...		
b. Firewood and Charcoal	...		
c. Bamboos	...		
d. Sandal-wood	...		
e. Grass and other Minor Produce	...		
II.—Timber and other Produce removed from the forests by Consumers or Purchasers:—			
a. Timber	...		
b. Firewood and Charcoal	...		
c. Bamboos	...		
d. Grazing and Fodder Grass	...		
e. Other Minor Produce	...		
III.—Drift and waif Wood and confiscated Forest Produce	...		
IV.—Revenue from forests not managed by Government:—			
a. Duty on Foreign Timber and other Forest Produce	...		
b. Revenue from Shared and Private Forests	...		
V.—Miscellaneous:—			
a. Fines and Forfeitures	...		
b. Refunds			
c. Other sources	359	0	0
Total Receipts	359	0	0

Expenditure.

A.—CONSERVANCY AND WORKS.

I.—Timber and other produce removed from the forests by Government agency:—			
a. Timber	...		
b. Firewood and Charcoal	...		
c. Bamboos	...		
d. Sandal-wood	...		
e. Grass and other Minor Produce	...		

FORM No. 58—*continued.*

Summary of Revenue and Expenditure of the Forest Survey Branch, Berar Division, during 1888-89—continued.

Expenditure—*continued.*

A.—CONSERVANCY AND WORKS—*continued.*

	R	a.	p.
II.—Timber and other Produce removed from the forests by Consumers or Purchasers	...		
III.—Drift and waif Wood and confiscated Forest Produce	...		
IV.—Revenue from forests not managed by Government :—			
a. Duty on Foreign Timber and other Forest Produce	...		
b. Revenue from Shared and Private Forests	...		
V.—Rent of Leased Forests and Payments to Shareholders in forests managed by Government	...		
VI.—Live Stock, Stores, Tools and Plant :—			
a. Purchase of Cattle	...		
b. Feed and Keep of Cattle	779	11	5
c. Purchase of Stores, Tools and Plant	40	0	0
VII.—Communications and Buildings :—			
a. Roads and Bridges	...		
b. Buildings	479	8	0
c. Other Works	...		
VIII.—Demarcation, Improvement, and Extension of Forests :—			
a. Demarcation			
b. Compensation for Land and Rights	...		
c. Surveys and Working-Plans	5,211	3	5
d. Sowing and Planting	..		
e. Protection from Fire	.		
f. Other Works	...		
IX.—Miscellaneous :—			
a. Refunds	...		
b. Law Charges	...		
c. Other Charges	374	11	0
TOTAL A.—CONSERVANCY AND WORKS	6,885	1	10

B.—ESTABLISHMENTS.

I.—Salaries :—			
a. Conservators	...		
b. Superior Officers	5,175	0	0
c. Upper Subordinate Establishments	4,265	0	0
d. Lower Subordinate Establishments	3,555	2	6
e. Deputation and Special Allowances	...		
II.—Travelling Allowances :—			
a. Conservators	...		
b. Superior Officers	1,151	4	0
c. Upper Subordinate Establishments	1,010	13	4
d. Lower Subordinate Establishments	1,121	13	0

FORM No. 58—*concluded.*

Summary of Revenue and Expenditure of the Forest Survey Branch, Berar Division, during 1888-89—concluded.

B.—Establishments—*continued.*

	R a. p.
III.—Contingencies—	
a. Stationery	...
b. Carriage of Tents and Records	56 4 0
c. Rents, Rates, and Taxes	300 0 0
d. Pay of Police Guards	...
e. Official Postage	84 6 6
f. Sundries	314 13 5
Total B.—Establishments	17,034 8 9
Grand Total of Expenditure	23,919 10 7

FORM No. 59.

Account Current of the Forest Surveys for the year 1888-89.

Dr.

	R a. p.	R a. p.
To Cash Balance	...	
To VIII—Assessed Taxes—Income Tax—Deductions from salaries	...	770 7 11
To Revenue, as per Annual Summary, Form No. 58	...	315 0 0
To Service Funds—		
Civil Fund—Ordinary, Bengal	...	
Civil Fund—Additional, Bengal	...	
Military Fund—Bengal	...	
Military Fund—Madras	...	
Military Orphan Fund—Bengal	...	
Uncovenanted Service Family Pension Fund—Bengal	514 14 0	
General Family Pension Fund	...	
Hindu Family Annuity Fund	...	
		514 14 0
To Deposits	...	
To Forest Cash Remittances—Local—		
Forest cheques drawn	...	
Inter-Divisional Transfers	...	
To Advances recoverable	...	33,147 0 6
To Suspense	...	17 8 7
To Account Current (other Governments)—		
Remittances from Government of N.-W. P. and Oudh	39,176 12 3	
Remittances from Central Provinces	15,561 5 0	
Remittances from Burma	27 0 0	
Remittances from Government of Punjab	1,092 0 0	
		55,857 1 3
To Inter-Departmental Transfers—		
Public Works Department	...	
Military Department	...	
Civil Department—		
Jail	...	
Mathematical Instrument Department	1,355 2 0	
Survey of India	3,619 11 5	
		4,974 13 5
Account Current with Foreign States—		
Berar Suspense Account	...	19,058 6 3
Total	...	1,14,655 3 11

Cr.

	R a. p	R a. p.
By Expenditure, as per Annual Summary, Form No. 58	...	36,316 14 2
By Deposits	...	
By Forest Cash Remittances—Local—		
Remittances to Treasuries	...	
Inter-Divisional Transfers	...	
By Advances Recoverable	...	33,864 13 8
By Suspense	...	17 8 7
By Account Current (other Governments)—		
Remittances to the Government of N.-W. P. and Oudh	1,713 10 5	
Remittances to Burma	27 0 0	
Remittances to the Government of Punjab	3,982 0 0	
Remittances to Central Provinces	11,171 0 0	
Remittances to the Government of Bengal	799 0 0	
		17,692 10 5
By Inter-Departmental Transfers—		
Public Works Department	...	
Civil Departments—		
Survey of India	331 8 0	
Mathematical Instrument Department	305 0 0	
		636 8 0
Account Current with Foreign States—		
Berar Suspense Account	...	26,126 13 1
By Cash Balance	...	
Total	...	1,14,655 13 11

FORM No. 61.

Outstandings and Liabilities on account of Contractors and Disbursers for 1888-89.

Division.	Department Debtor.			Department Creditor.			Balance due.	
	At commencement of year.	Recoveries in cash and value of supplies and work done during the year.	At close of year.	At commencement of year.	Payments made during year.	At close of year.	To Department (Outstandings).	By Department (Liabilities).
		R a. p.	R a. p.	R a. p.	R a. p	R a. p.	R a. p	
Forest Surveys . .	...	33,147 0 6	33 147 0 6	1,824 3 3	33,864 13 8	35,689 0 11	2,542 0 5	...
Total . .	...	33,147 0 6	33,147 0 6	1,824 3 3	33,864 13 8	35,689 0 11	2,542 0 5	...

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